

Constellation Comments, at 29.

LQP concurs in these additional reasons why the Commission must assign the entire S-band for CDMA downlinks. In short, there is no legal or technical support for the Commission's S-band proposal. Efficient and workable MSS systems depend on assignment of the entire S-band.

D. The CDMA L-Band Segment Should Not Be Reduced.

The Commission received a number of comments which establish reasons why it should not adopt its proposal to truncate the spectrum available for CDMA systems if only one U.S. licensee meets the Commission's milestones. See NPRM, 9 FCC Rcd at 1112, ¶ 33. In addition to the reasons identified by LQP, the commenters pointed out that the Commission's proposal was flawed because it ignored the potential for foreign MSS systems operating in the band. Moreover, commenters explained that the proposed reduction could impose significant costs on CDMA systems, thereby increasing the difficulty of implementing global MSS.

1. Reducing the CDMA Bandwidth Would Make International Coordination More Difficult.

It is short-sighted to assume that the failure of all but one U.S. licensed CDMA systems would establish that "only one CDMA system is implemented." Id. As TRW pointed out, there may be a foreign CDMA system with which a sole U.S.-licensed CDMA system would have to share the band. TRW Comments, at 64-65.

Indeed, in this regard, the Commission was criticized for adopting a parochial view of licensing MSS systems:

In essence, the Commission's 'a priori' band segmentation sharing proposal effectively carves up the allocated spectrum in the 1610-1626.5/2483.5-2500 MHz for global MSS systems and ignores the fact that Inmarsat, and potential operators in other countries, have filed advance notifications for this spectrum at the International Frequency Registration Board ('IFRB').

COMSAT Comments, at 8. If a foreign MSS system is present -- as COMSAT suggests is probable<sup>11</sup> -- then the Commission's reasons for reduction of the CDMA segment would be negated:

- A foreign CDMA system would cause as much interference as a second domestic CDMA system, thereby limiting the capacity of a U.S. licensee. If the Commission reduced the assigned CDMA segment to 8.25 MHz in such a sharing scenario, then it cannot be assumed that the spectrum "should be sufficient to implement a viable system." NPRM, 9 FCC Rcd at 1112, ¶ 33.

- Coordination of the U.S. system would, in fact, be made more difficult, rather than more flexible as the Commission expects. Id. Coordination consumes spectrum; the less there is available, the less flexibility the two coordinating administrations would have.

- And, there would be no room for expected growth. As LQP pointed out in its comments, proposing to assign the "excess" 3.1 MHz to a new entrant would severely constrain its design. LQP

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<sup>11</sup> The administrations of INMARSAT, France, Germany, The Netherlands, Indonesia and Tonga have advance published and/or requested coordination for satellite systems using the 1610-1626.5 MHz band. See Reply Tech. App. at § 1.1.

Comments, at 38-39. Adding such a system would also make coordination with any international system even more difficult for the existing U.S. licensees.

2. Reducing the CDMA Bandwidth Would Make Sharing with Radioastronomy More Difficult.

If CDMA systems are assigned to the lower segment of the MSS L-band, they also would require bandwidth in the upper portion of L-band to ensure continuity of service in the United States due to required protection of radioastronomy observatories. See Proposed 47 C.F.R. § 25.213(a). CDMA systems operating in the lower portion of the L-band would be required to move MSS mobile earth station (MES) users which are close to radioastronomy observatories to channel assignments significantly removed from the RAS band (1610.6-1613.8 MHz). See Reply Tech. App., at § 1.1; LOP Comments, at 40. Additionally, the Committee on Radio Frequencies has proposed a protection zone for the 1613.8-1615.8 MHz band to protect RAS from out-of-band emissions. CORF Comments, at 3-4.

Decreasing the CDMA bandwidth makes it more difficult to assign frequencies with sufficient separation to accommodate these users. LQP requires an allocation up to 1621.35 in order to guarantee continuity of service due to coordination with RAS. See Reply Tech. App., at § 1.1.

Related issues were raised in comments of radioastronomers. Cornell University, which operates the Arecibo Observatory, expressed its concern that by increasing the potential bandwidth

of the TDMA system's secondary downlink, the Commission could "close another valuable window to the Universe." See Cornell University Comments, at 5. Cornell noted that secondary downlink transmissions could impede its observations. See id. If the TDMA system were assigned an additional 3.1 MHz to allow operations of its downlinks at 1618.25, the potential for impeded observations would radically increase. See Reply Tech. App., at § 1.1. In order to ensure protection of RAS and continuity of MSS operations, the Commission should not reduce the CDMA bandwidth at all.

3. Reduction of the CDMA Bandwidth Could Seriously Impair Competitive Operation of a CDMA System.

LQP, TRW and Mobile Datacomm pointed out the inequities in the Commission's "50/50" L-band proposal. The Commission suggests that it would reduce the CDMA operator's available frequencies by 3.1 MHz "without hearing" and assign this spectrum to the TDMA operator on a showing of need. NPRM, 9 FCC Rcd at 1112, ¶ 33. However, no provision is made for allowing the CDMA operator to retain the 3.1 MHz on a similar showing of need. See TRW Comments, at 63-64; Mobile Datacomm Comments, at 4; LOP Comments, at 39-40. As LQP noted, such reduction imposes a double penalty on CDMA systems, from which the TDMA operator is completely free. A CDMA system's use of the lower half of the L-band is impaired because licensees must coordinate with the Radio Astronomy Service. Reducing the available spectrum for redistribution to a competitor (which the Commission has found

can operate in substantially less than 5.15 MHz, NPRM, 9 FCC Rcd at 1111 n.62) creates another impairment by reducing the CDMA operator's flexibility and capacity to serve consumers. If the CDMA operator has saturated the capacity available in 11.35 MHz by the time proposed for "automatic" reduction, then it may also be required to eliminate subscribers for the benefit of its competitor. That makes no sense.

Both TRW and Mobile Datacomm also note that the "50/50" plan deprives CDMA operators of needed certainty. "The primary issue overlooked in the Notice is the economic consequence of imposing an uncertain frequency allocation on wideband CDMA systems." Mobile Datacomm, at 4. Mobile Datacomm suggests that the CDMA operator may have to absorb costs related to the complexity of building satellites for the 8.25 MHz contingency. Id. at 5-6. Similarly, TRW notes that channelization options are different for 11.35 MHz and 8.25 MHz, and a reduction in available bandwidth may have an impact on capacity. "CDMA systems may have trouble seeking investors and partners if they have to face the prospect of having their assignment cut by nearly one-third at any time for circumstances completely beyond their control." TRW Comments, at 65 n.102.

LQP's further study of this issue indicates that the Commission's proposal does raise serious concerns regarding operational costs. As discussed in the Technical Appendix, the availability of more L-band spectrum for CDMA operators benefits consumers. The EIRP of the mobile earth station uplink can be

decreased if more spectrum is available, allowing longer talk time per battery charge. Reduction of the CDMA segment from 11.35 to 8.25 MHz would increase the average MES EIRP by over 100%, reducing talk time per battery charge by 51%. Reply Tech. App., at § 1.1. In short, there are technical ramifications of reducing CDMA bandwidth after it has been assigned, which would have an impact on costs and service. Consideration of these and the other concerns outlined above provide convincing evidence that the CDMA bandwidth should not be reduced at all.

4. Motorola Has Provided No Justification  
for Reduction of the CDMA Bandwidth.

Motorola presents several unsupported arguments in favor of the Commission's "50/50" proposal.<sup>12</sup> Motorola claims that, if the 3.1 MHz were taken from the CDMA segment, then it should not be required to demonstrate any need for it. Rather, according to Motorola, to treat the TDMA operator "fairly," reassignment must be "automatic." Motorola Comments, at 40. This argument is easily rejected. The Commission's band-sharing plan must have a technical basis, and cannot be grounded in just one applicant's

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<sup>12</sup> It should be noted that the Commission's proposal represents a resurrection of Motorola's position at the NRC that the L-band should be divided equally between TDMA and CDMA operations. Cf. NRC Report, Annex 1, Att. 2 ("Report of Motorola on Band Segmentation Sharing"). Yet, the NRC never reached consensus on Motorola's "vision," and the majority of interested parties rejected it. See NRC Report, Annex 1, Att. 1 ("Final Report of the Majority of the Active Participants of Informal Working Group 1").

view of what it "deserves." The proposed automatic reduction has neither a technical nor a legal basis.

Motorola also claims that requiring it to demonstrate "need" for additional spectrum upsets the competitive balance between CDMA and TDMA systems. Motorola Comments, at 40-42. In the same breath, it states that it will "most assuredly" need extra spectrum. Id. Obviously, Motorola believes that it should not have difficulty establishing a need for more spectrum, and therefore, it would suffer no prejudice by so doing. If Motorola believes competition should be the determining factor, then all systems should have the right to contest for additional spectrum.

E. The Commission Should Reject TRW's Proposal for Extraterritorial Extension of the Band-Sharing Plan.

The Commission has already indicated that TRW's proposed extraterritorial extension of any band-sharing plan within the United States would be improper. See TRW Comments, at 80. In the NPRM, the Commission stated correctly that "the applicability of the [proposed band-sharing] plan outside the U.S. will necessarily depend upon authorizations granted by the countries concerned." NPRM, 9 FCC Rcd at 1111 n.63. At the U.S. borders, any band-sharing plan will depend upon decisions in international coordination. Id. Accordingly, the Commission cannot simply impose its will -- and band-sharing plan -- on other administrations, as TRW demands.

The Commission discussed the same issue in the "Little LEO" proceeding where it also rejected the position espoused by TRW.

See Report and Order, 8 FCC Rcd 8450 (1993) (NVNG MSS Order). It recognized that it may condition U.S. licenses on fulfillment of international obligations and national requirements of other licensing administrations, but "the efforts of these other jurisdictions to implement [MSS] service within their own territories will remain within their control." NVNG MSS Order, 8 FCC Rcd at 8458, ¶ 28; see NPRM, 9 FCC Rcd at 1140, ¶ 92. As the Commission noted, this is a basic tenet of international telecommunications policy: "Other administrations will thus be assured 'equitable and standard conditions of access' to meet their domestic needs, in accordance with ITU Resolution No. 70 (WARC-92)." NVNG MSS Order, 8 FCC Rcd at 8458 n.53.

Moreover, the Commission rejected for the NVNG MSS service exactly the type of rule which TRW's proposal would permit. In that proceeding, Space Technology Systems International (STSI) requested the Commission to authorize a U.S.-licensed MES to access foreign-licensed NVNG space stations. The Commission rejected this proposed regulation, reserving for bilateral, government-to-government procedures, each administration's authorization for use of its space stations.<sup>13</sup> See NVNG MSS Order, 8 FCC Rcd at 8454, ¶ 13.

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<sup>13</sup> Thomas Tycz, Deputy Chief of the Domestic Facilities Division, recently stated, in response to criticism of this proceeding by a representative of the European Community, "The FCC is licensing for the U.S. The FCC can't dictate to some other country how they're going to license [satellite systems]. They have to make their own choices." Telecommunication Reports, Vol. 60, No. 23, at 27 (June 6, 1994).



Adoption of TRW's proposal would create an international furor which would surely impede introduction of MSS by U.S. licensees. Cf. Letter of Delegation of the Commission of the European Communities to the U.S. Department of State (June 1, 1994).<sup>14</sup> The Commission should follow recognized international policy, and allow each sovereign jurisdiction to decide the authorized parameters for MSS within its borders.

F. The Commission Must Require Newly-Launched Systems to Coordinate with In-Orbit Systems.

LQP agrees with TRW that, once CDMA systems have coordinated, it is incumbent upon a newly-launched system to demonstrate that it can operate compatibly with an in-orbit system. TRW Comments, at 79-80. The NPRM includes ambiguous language which suggests that the burden of operational coordination would be borne by the in-orbit system. NPRM, 9 FCC Rcd at 1111, ¶ 32. While it is true that, by the time of launch of the second system, the two systems should already be coordinated, the newcomer rather than the operating system should bear the burden of coordinating operations.

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<sup>14</sup> "In view of their extra-territorial implications, the European Commission considers that technical requirements and conditions can only be imposed at national level after agreement has been concluded at world level in appropriate fora, in particular in the ITU. In this respect the Notice, in addition to domestic US requirements, suggests orbit, frequency and coverage considerations with direct implications at global level. Examples are the band sharing plan itself, the conditions on coverage worldwide, and the use of non-geostationary orbits only."

G. The Commission Should Adopt Two Additional Proposals Which Facilitate MSS Operations.

Ellipsat proposed two rules not identified in the NPRM which would facilitate MSS operations:

1. Reassignment of Unused Spectrum. Ellipsat proposed that if the TDMA system failed, then the entire uplink band should be reassigned to the remaining CDMA systems. See Ellipsat Comments, at 27. LQP agrees with this suggestion. By making more spectrum available to existing CDMA systems, the Commission could improve the potential for coordination of MSS uplinks with international systems, and improve the ability of domestic CDMA systems to provide service through interference sharing.<sup>15</sup>

2. Restriction on Secondary Downlinks. Ellipsat also proposed that the Commission restrict MSS secondary downlink transmissions in L-band to the TDMA segment, because only Motorola proposed to operate on a bidirectional basis. Ellipsat Comments, at 28. LQP supports this proposal. Motorola's downlink transmissions are secondary and cannot cause harmful interference to primary uplink transmissions; yet, there is a substantial potential for such interference. See NRC Report, Annex 1, Att. 1, at § 4. Such interference can be ameliorated in part by not allowing Motorola to operate co-frequency with the CDMA systems. Although, under the Commission's proposal,

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<sup>15</sup> In order to plan for spectrum reassignment contingencies, the Commission should authorize MSS licensees to construct their systems over the entire L-band and S-band, but should authorize them to operate only in that portion assigned (or reassigned) to a particular access technology.

Motorola would appear not to have authority to operate in the CDMA segment at all, LQP concurs that the Commission should make that restriction explicit.

III. USING AUCTIONS, LOTTERIES OR COMPARATIVE HEARINGS TO ASSIGN MSS SPECTRUM WOULD NOT SERVE THE PUBLIC INTEREST.

LQP discussed in its initial comments why a properly-crafted band-sharing plan for assignment of MSS spectrum would serve the public interest, while the use of auctions, lotteries and comparative hearings would not. See LQP Comments, at 45-60. The parties commenting on these issues generally agreed with LQP's assessment. Moreover, as the LEO applicants have now acceded to use of a properly-crafted band-sharing plan, the Commission should focus its efforts on resolving the issues raised by its proposal (as discussed above), and expediting the licensing of MSS systems without the use of auctions, lotteries or comparative hearings.

A. Neither Comparative Hearings Nor Lotteries Are Feasible Methods for Assignment of MSS Above 1 GHz Spectrum.

Comparative hearings for assignment of MSS spectrum would impermissibly delay the authorization of the proposed systems and "delay the provision of needed service to the United States." NPRM, 9 FCC Rcd at 1114, ¶ 40; LQP Comments, at 49-50. Moreover, the Commission has admittedly not developed policies and procedures to select among competing satellite technologies. See MSS Tentative Decision, 6 FCC Rcd 4900, 4904 (1991). Thus,

choosing among the applicants would be nearly impossible.<sup>16</sup> Other commenters agreed. As Constellation stated, "[e]ach of the LEO applicants has its own approach to implementing LEO technology and creating a new business. It would be difficult for the Commission to specify comparative criteria that would reflect the unique capabilities of this technology."

Constellation Comments, at 33.

Lotteries also present legal and logistical problems. The criteria for use of a lottery set forth by Congress are not met for assignment of MSS spectrum.<sup>17</sup> LOP Comments, at 56-58. Further, like comparative hearings, use of lotteries would impose delay on processing and make irrelevant the substantial differences among the applicants in their capacities to provide the economic and service advantages of MSS systems. Id., at 58-60. Other commenters again agreed. "The results of a lottery would bear no relation to the best use of the available spectrum or otherwise to serving the public interest. In a lottery an applicant could end up (indeed, would most likely end up) with

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<sup>16</sup> TRW suggested that the Commission could use a streamlined comparative hearing based on a set of technical standards to resolve this proceeding if a band-sharing plan proved ineffective. TRW Comments, at 86-88. TRW provided no suggestions as to what technical standards would be appropriate, nor how the Commission would conduct such a procedure. To resolve those issues alone would in all likelihood consume more time and resources than finding an acceptable band-sharing plan.

<sup>17</sup> Constellation suggested that a lottery would be the "least objectionable" alternative to band-sharing, but failed to even consider the criteria outlined by Congress. See Constellation Comments, at 36.

band segments that are incongruous, insufficient or unusable by its system." Motorola Comments, at 49.

Based on the comments of LQP and other parties in this proceeding, the Commission should forego any further consideration of lotteries and comparative hearings to assign MSS Above 1 GHz spectrum to the pending applicants.

B. All the LEO Applicants Agreed That MSS Spectrum Auctions Would Be Contrary to the Public Interest.

The LEO applicants agreed with LQP that use of auctions for MSS/RDSS spectrum would not be consistent with the statute authorizing competitive bidding in the Budget Act or with the public interest. See LQP Comments, at 50-56; Constellation Comments, at 34-36; Ellipsat Comments, at 14; Motorola Comments, at 47-49; TRW Comments, at 83-86. Several commenters pointed out that the Commission is required to use engineering solutions to avoid mutual exclusivity among applicants, and, as long as a workable band-sharing plan is available, auctions should be a "last resort." See Constellation Comments, at 34; Ellipsat Comments, at 14; Motorola Comments, at 47-49; TRW Comments, at 83-86. Thus, there is general agreement that the authorizing legislation for competitive bidding does not permit the Commission to use an auction to assign MSS spectrum as long as a workable spectrum-sharing plan is available.

The likely adverse international ramifications of conducting a spectrum auction in the United States were of particular concern to many parties interested in global MSS. See LQP

Comments, at 52-53; Motorola Comments, at 49; TRW Comments, at 92-94; COMSAT Comments, at 10. These parties pointed out that a series of international MSS spectrum auctions would make the cost of providing global MSS service prohibitively expensive. See, e.g., Motorola Comments, at 49. COMSAT, the U.S. INMARSAT signatory, stated that "[a] worldwide trend to implement auctions not only will significantly drive up the cost of providing global MSS operations, but there is also the danger that auctions conducted by other countries may be invoked as trade barriers or other mechanisms to unfairly discriminate against U.S. companies." COMSAT Comments, at 10. Given the breadth of experience of the parties raising this concern, the Commission should recognize that a spectrum auction would jeopardize the ability of any MSS LEO system to provide the global services intended for this service. Cf. NPRM, 9 FCC Rcd at 1105-06, ¶¶ 20-21.

Commenters also noted that the legislative history of the Budget Act (and Chairman Dingell's subsequent letter) urges the Commission not to use competitive bidding in this proceeding. See IOP Comments, at 54; Motorola Comments, at 48; Constellation Comments, at 34 n.41. In short, no commenter supported the Commission's tentative conclusion that MSS spectrum auctions would further the public interest. See NPRM, 9 FCC Rcd at 1117, ¶ 43. Almost all parties commenting on this issue marshalled substantial evidence which negates that conclusion. Accordingly, the Commission should reach the same conclusion as the

commenters: spectrum auctions are not suitable for MSS Above 1 GHz.

C. Were the Commission to Use MSS Spectrum Auctions, It Should Initiate Another Proceeding to Develop an Appropriate Auction Procedure.

LQP pointed out in its comments that the Commission's proposal for an MSS auction format was simply untenable. LQP Comments, at 55-56; see also Constellation Comments, at 35. Other parties made suggestions regarding an auction format, which raise sufficiently complex issues as to require a separate proceeding before the Commission can reach an informed decision on format.

1. Which Frequencies Qualify for Auctions?

As TRW points out, the Budget Act permits spectrum auctions only where mutual exclusivity is present. See TRW Comments, at 95-97; 47 U.S.C. § 309(j)(1) ("If mutually exclusive applications are accepted for filing for any initial license or construction permit which will involve the use of the electromagnetic spectrum"). Two spectrum blocks at issue in this proceeding were sought only by applicants which have agreed to share spectrum through CDMA technology: 2483.5-2500 MHz and 1610-1616 MHz.<sup>18</sup> As TRW notes, the Commission ignored this issue in its analysis of MSS auction format. NPRM, 9 FCC Rcd at 1117-18, ¶ 45. The

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<sup>18</sup> The Commission has already correctly determined that feeder link spectrum is not subject to competitive bidding. See Second Report and Order, FCC 94-61, at ¶ 43 (released Apr. 20, 1994).

language of the Budget Act raises a substantial question whether, under the circumstances noted by TRW, these two spectrum blocks qualify for competitive bidding. Indeed, the Commission has already found that "shared spectrum is inappropriate for competitive bidding." Second Report and Order, FCC 94-61, ¶ 13 (released Apr. 20, 1994). But, because these spectrum blocks are integral to MSS Above 1 GHz, it may be contrary to the public interest to assign their use piecemeal. Resolution of this issue clearly requires a separate proceeding.

## 2. What Size Spectrum Blocks Should Be Auctioned?

As LQP and Constellation pointed out, the proposal to auction blocks of 2.065 MHz is inconsistent with any channelization scheme proposed by the pending MSS applicants. See LQP Comments, at 55; Constellation Comments, at 35. In order to make spectrum blocks useful, the Commission should use multiples of 1.25 MHz blocks, and applicants should be permitted to bid on as many blocks as their systems require.

## 3. Should Bidding Consortia Be Permitted?

TRW proposes that multiple applicants be allowed to agree prior to bidding that they would pool their resources to obtain a sufficient amount of spectrum for shared use. TRW Comments, at 102-03. Consistent with the Commission's announced auction procedures, it should reject TRW's suggestion.



As the Commission recognized, "collusive conduct by bidders prior to or during the auction process could undermine the competitiveness of the bidding process and prevent the formation of a competitive post-auction market structure." Second Report and Order, FCC 94-61, at ¶ 233 (released Apr. 20, 1994) (emphasis supplied). While the Commission has proposed to permit bidding consortia, such bidding consortia would generally receive only one license. Here, TRW proposes to combine with other applicants to obtain spectrum for which each participant would receive an operating license. If allowed, all bidders would join such consortia, totally undermining the competitiveness of the bidding process.

If the Commission were to award MSS Above 1 GHz licenses by auction, it should reject the "bidding consortia" proposed by TRW. Awarding licenses to applicant-members in such a consortia appears contrary to the Communications Act because the members of the proposed consortia would decide how to use spectrum awarded to the consortium, dividing a market or the spectrum according to the members' interests. Ceding such authority to licensees would be contrary to the Commission's responsibility under the Communications Act to allocate spectrum and award licenses for its use.<sup>19</sup> See 47 U.S.C. § 301, 303(c). Unless further refined,

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<sup>19</sup> For example, if a dispute arose among the licensee-members of a consortium regarding the use of the spectrum, then the Commission may be asked to decide how the members intended to use the spectrum by agreement rather than how the Commission intended the spectrum to be used in the public interest.

the TRW proposal appears contrary to the Communications Act and the public interest, and should be rejected.

IV. THE COMMISSION SHOULD ADOPT ELIGIBILITY REQUIREMENTS FOR MSS ABOVE 1 GHZ WHICH ENSURE EFFICIENT USE OF SPECTRUM AND EXPEDITED DELIVERY OF NEW AND ENHANCED MSS TO THE PUBLIC.

Like LQP, the LEO applicants generally supported the Commission's framework for eligibility standards for MSS Above 1 GHz. However, proposals were made for making certain requirements more stringent and for relaxing others. LQP remains convinced that the Commission's initial proposals were generally on target and should be adopted with a few minor modifications. By adopting these modified proposals, the Commission can facilitate expeditious implementation of MSS systems and the delivery of robust MSS to the public in the near future.

A. MSS Above 1 GHz Should Be Reserved for LEO Systems.

Consistent with its mandate "to encourage the provision of new technologies and services to the public," 47 U.S.C. § 157, the Commission has proposed to restrict licensing for MSS Above 1 GHz to LEO satellite constellations only. NPRM, 9 FCC Rcd at 1105, ¶ 20. The Commission found that "a LEO-only design requirement should provide U.S. customers with the maximum access to a new, alternative voice-MSS technology, to the benefit of the public." Id.

The comments in this proceeding fully support the Commission's proposal.<sup>20</sup> These comments confirm that LEO systems provide social, economic, and technical benefits that are different from and superior to those which can be provided by GSO systems. Licensing only LEO systems in the 1.6/2.4 MHz bands would thus offer substantial benefits, and would provide access to new technologies for MSS-delivered service. No party has raised compelling arguments why GSO systems should be licensed for MSS Above 1 GHz. Accordingly, the Commission should adopt its proposal to restrict the orbital height of MSS Above 1 GHz systems to low-earth orbit.

1. LEO Systems Provide Societal, Economic, and Technical Benefits Over GSO Systems.

The comments demonstrate that LEO systems can bring new and enhanced, satellite-delivered communications services across the globe effectively and efficiently, providing the societal, economic and technical benefits, which the Commission recognized in the NPRM, 9 FCC Rcd at 1105-06, ¶¶ 20-21.

a. Societal benefits. The societal benefits that LEO-provided satellite systems will bring to the global marketplace include extending sophisticated telecommunications service to rural and underserved areas and providing unimpeded communications service during global emergencies and natural

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<sup>20</sup> The only dissenting views were voiced by AMSC Subsidiary Corporation and COMSAT Corporation, both of which are authorized to provide satellite services with GSO systems.

disasters. Global roaming, currently unavailable through cellular telephone providers, will add an entirely new dimension to links between business travelers and home offices, U.S. diplomats and Washington officials, and relief or development workers in the field and central service offices. See LOP Comments, at 13; Motorola Comments, at 5; Honeywell Comments; Red Cross Comments; Peace Corps Comments. Because low-earth orbit enables coverage of all geographic regions of the globe, LEO MSS systems are uniquely positioned to offer these improvements in wireless telecommunications.

b. Economic benefits. The demand for U.S.-made computers, terminals, displays, software, antennas, and transmission equipment in foreign markets should dramatically increase as a direct result of the implementation of MSS Above 1 GHz service. See LOP Comments, at 18. Other commenters noted that significant, ancillary benefits would flow from LEO systems in these bands. Subscribers using the new ubiquitous telephony provided by LEO systems will have a greater capacity to seek out information about products from other countries, including the United States. Hence, consumers from overseas and rural areas will have a wealth of new choices available, promoting the growth of U.S. and foreign markets. See Motorola Comments, at 11-13; Constellation Comments, at 15-16.

c. Technical benefits. The Commission recognized in the NPRM that there are significant technical benefits associated with LEO systems, including lower orbital altitudes that shorten

transmission time, more options for system design because LEOs require lower power between satellite and terrestrial equipment, and greater coverage because LEOs are not confined to an equatorial orbit. See NPRM, 9 FCC Rcd at 1105, ¶ 20.

The lower orbits of LEO systems permit use of lower power for transmissions from mobile earth stations to the satellite than GSO systems, which translates into the real service benefit of allowing subscribers to carry handheld units, as opposed to the bulky "suitcase" telephones required to utilize GSO service. LOP Comments, at 7. Ellipsat also pointed out that lower power requirements decrease the cost of equipment and services to consumers. Ellipsat Comments, at 19. Low-cost service will enable delivery of telecommunications capability to underserved rural and underdeveloped areas more quickly.

2. AMSC Has Not Shown That GSO Systems Should Be Licensed.

The Commission has authorized AMSC to construct, launch, and operate three geostationary satellites in the upper L-Band.<sup>21</sup> Even though AMSC missed its milestone launch date of July 1993,<sup>22</sup> it now maintains in this proceeding that its proposal is "by far the most realistic, practical, and capable of prompt effectuation." AMSC Comments, at 17. However, AMSC has advanced

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<sup>21</sup> See MSS Tentative Decision, 6 FCC Rcd 4900, aff'd, MSS Final Decision, 7 FCC Rcd 266 (1992), appeal dismissed sub nom. Aeronautical Radio, Inc. v. FCC, 983 F.2d 275 (D.C. Cir. 1993).

<sup>22</sup> See Application File Nos. 13-DSS-AMEND-94 and 14-DSS-AMEND-94 (filed Feb. 2, 1994).

no argument which should deter the Commission from adopting its proposal to limit MSS Above 1 GHz service to LEO systems.

The Commission intends that MSS Above 1 GHz systems provide global service. NPRM, 9 FCC Rcd at 1105, ¶ 21. AMSC concedes in its comments that GSO systems can provide only "near-total coverage" of the Earth. AMSC Comments, at 21. AMSC argues that LEO systems are inefficient because they emit numerous satellite beams that cover both populated and unpopulated areas of the Earth. Id. However, it is precisely this comprehensive coverage that makes LEO systems more efficient than GSO systems because they make the marginal costs of providing service to small villages and outlying areas practically zero. AMSC would have to launch more satellites, with all the accompanying costs, in order to cover less populated areas and to attempt to establish seamless global roaming.

AMSC suggests that there are technical defects in LEO systems, including call dropouts and difficulty penetrating buildings. Id. at 24. However, call dropout is a phenomenon common to all types of wireless telephony. AMSC provides no evidence that LEO systems in particular suffer more frequently from dropouts due to blockage than other types of technologies.

AMSC claims that handheld telephone reception by LEO and GSO systems would be "quite poor" because handheld telephones cannot be used inside buildings. Id. But, subscribers inside buildings can generally connect to the public switched network without the need for a satellite service, making the quality of

voice service inside buildings essentially irrelevant. The important service difference between LEO and GSO systems is that LEO systems would provide service to handheld transceivers in their first generation while GSO systems would not. See LOP Comments, at 12.

AMSC also claims that LEO satellites should not be considered "particularly worthy" as a new technology. AMSC Comments, at 26. But, LEO systems would provide a new commercial use which would diversify the Mobile Satellite service offerings to subscribers. See LOP Comments, at 11-15.

AMSC even questions the financial viability of the LEO applicants. AMSC Comments, at 30. But, the issue of whether each applicant is financially qualified is irrelevant to adopting rules for licensing MSS systems. Id. at 30. As AMSC itself recognizes, the Commission has proposed rigid financial standards for applicants in MSS Above 1 GHz. See NPRM, 9 FCC Rcd at 1107-08, ¶ 26. LEO applicants must ultimately meet the Commission's financial standards to receive a license. AMSC's argument is clearly premature.

AMSC's arguments miss the mark because they are tailored to promote its system over those of the LEO applicants.<sup>23</sup> But, the Commission's LEO-only standard was not proposed merely because AMSC's system is less worthy than those of the LEO applicants, or

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<sup>23</sup> AMSC raises questions concerning the use of the 1.6/2.4 GHz bands by LEO systems. AMSC Comments, at 33-34. These concerns have been addressed in LOP's Comments (at Sections VII-VIII) and in these Reply Comments (at Sections V-VI).

because the LEO applicants themselves are more qualified. Rather, it has a fundamental basis in the Commission's obligations to provide the U.S. public with a diverse array of telecommunications services and to encourage the provision of such services by innovative technologies. See 47 U.S.C. § 157.

For example, among terrestrial mobile services, the Commission has provided spectrum for several different types of services and technologies, including cellular telephone, Personal Communications Services, and Specialized Mobile Radio Services. By implementing a LEO design requirement for MSS Above 1 GHz, the Commission is similarly providing for diversity in MSS services and fostering the development of a new commercial technology. This decision lies at the heart of the Commission's authority under the Communications Act, and AMSC has presented no argument which challenges the reasonableness of this approach.

B. Geometric Coverage Standards Should Be Adopted.

LQP supports both the proposed global and U.S. coverage standards, but recommends that these standards be applied on a geometric basis only as the Commission initially proposed.

1. Global coverage. LQP supports the Commission's proposed eligibility standard for global coverage with a minor adjustment in the definition of the area which must be covered by any system. Specifically, as stated in LQP's initial comments, the global coverage standard should be limited to 75° North and South latitude. See LQP Comments, at 19-20. This standard will



fulfill the goal of restricting eligibility to global systems while avoiding the imposition of unjustified costs. Most applicants who commented on this aspect of the Commission's proposed rules likewise recommended an approach based on coverage to all permanently populated areas. See Constellation Comments, at 38; TRW Comments, at 30; Ellipsat Comments, at 32.

Other commenters proposed unduly stringent or improvident standards, and LQP opposes these suggestions. First, the elevation angle proposed by the Commission (and used for other standards by the ITU-R in international fora)<sup>24</sup> ensures "global coverage" and should not be modified. Increasing the required elevation angle at which at least one satellite must be visible above the horizon would impose an unnecessarily rigid design requirement. Ellipsat suggested such a modification, but offered no substantiation for its claim that the 5° standard proposed by the Commission is somehow inadequate. See Ellipsat Comments, at 32. A 5° elevation angle serves the Commission's purpose in achieving global coverage and should be adopted.

Second, the global coverage requirement should be a coverage, and not a service, standard. The coverage standard by the Commission represents a rational, workable and easily demonstrated approach to defining what constitutes global LEO MSS. Imposing a service standard, as proposed by Motorola (Motorola Comments, at 18-20), would unnecessarily involve the

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<sup>24</sup> The S-band PFD limit with its break point at 5° is an example.